

CLAIMS

1. A modified hydrogenated copolymer comprising:

a hydrogenated copolymer obtained by hydrogenating  
5 an unhydrogenated copolymer comprising conjugated diene  
monomer units and vinyl aromatic monomer units, said  
unhydrogenated copolymer having at least one polymer  
block (H) of said vinyl aromatic monomer units, and

a functional group-containing modifier group

10 bonded to said hydrogenated copolymer,

said modified hydrogenated copolymer having the  
following characteristics (1) to (4):

(1) a content of said vinyl aromatic monomer  
units of from more than 60 % by weight to less than  
15 90 % by weight, based on the weight of said hydrogen-  
ated copolymer,

(2) a content of said polymer block (H) of from  
0.1 to 40 % by weight, based on the weight of said un-  
hydrogenated copolymer,

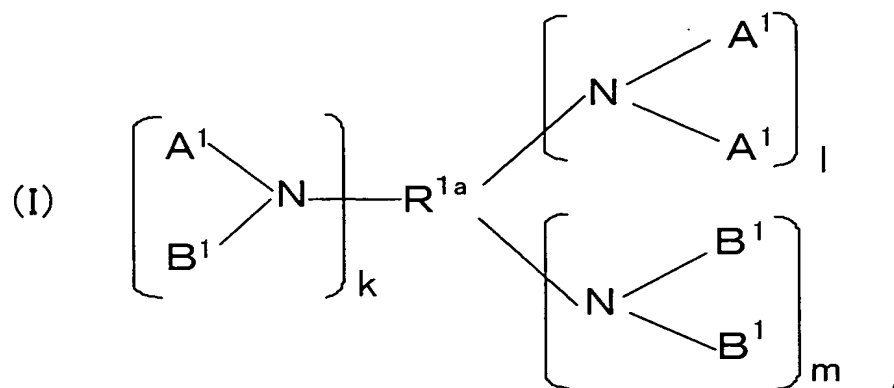
20 (3) a weight average molecular weight of from  
more than 100,000 to 1,000,000, and

(4) a hydrogenation ratio of 70 % or more, as  
measured with respect to the double bonds in said con-  
jugated diene monomer units.

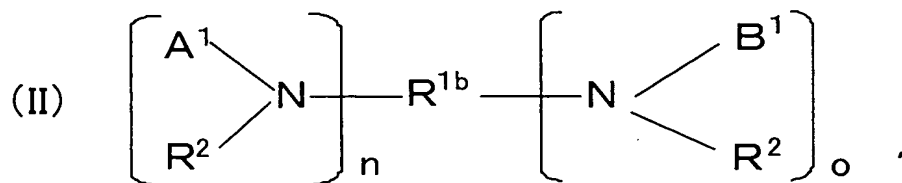
2. The modified hydrogenated copolymer according to claim 1, which is represented by a formula selected from the group consisting of the following formulae (I) to (V):

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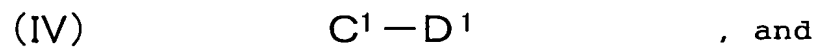
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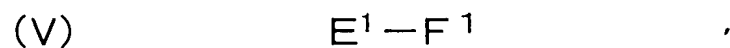
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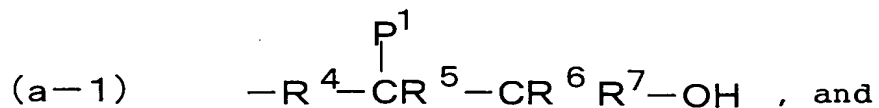
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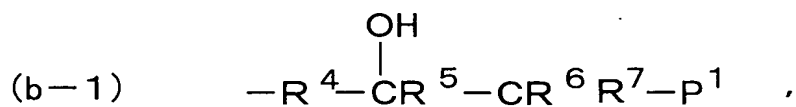
wherein:

A<sup>1</sup> represents a unit which is represented by any one of the following formulae (a-1) and (b-1):

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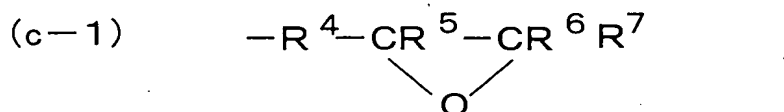


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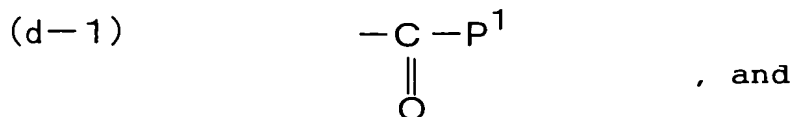
B<sup>1</sup> represents a unit which is represented by the following formula (c-1):

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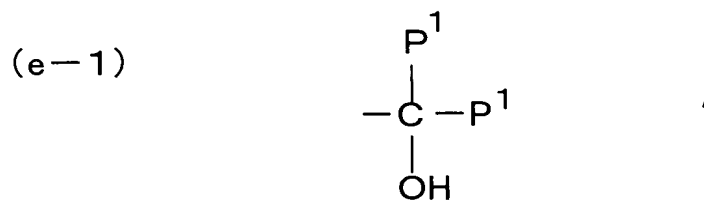


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C<sup>1</sup> represents a unit which is represented by any one of the following formulae (d-1) and (e-1):



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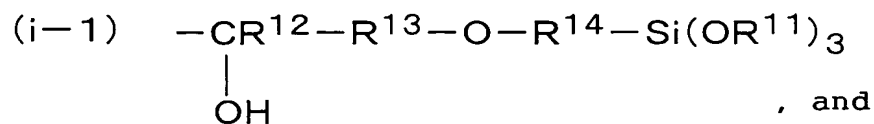
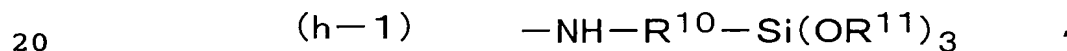
D<sup>1</sup> represents a unit which is represented by the following formula (f-1):



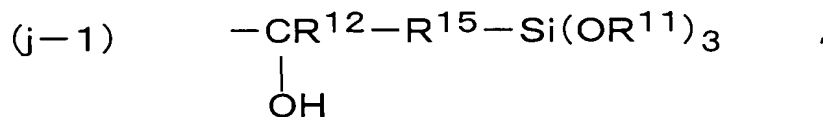
E<sup>1</sup> represents a unit which is represented by the following formula (g-1):



F<sup>1</sup> represents a unit which is represented by any one of the following formulae (h-1) to (j-1):



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5                    wherein, in the formulae (I) to (III)  
and (a-1) to (j-1):

N represents a nitrogen atom, Si  
represents a silicon atom, O represents  
an oxygen atom, C represents a carbon  
10                    atom, and H represents a hydrogen atom,

P<sup>1</sup> represents said hydrogenated co-  
polymer,

each of R<sup>1a</sup>, R<sup>1b</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>8</sup> to R<sup>10</sup>  
and R<sup>13</sup> to R<sup>15</sup> independently represents  
15                    a C<sub>1</sub>-C<sub>48</sub> hydrocarbon group and option-  
ally independently has at least one  
functional group selected from the group  
consisting of a hydroxyl group, an epoxy  
group, an amino group, a silanol group  
20                    and a C<sub>1</sub>-C<sub>24</sub> alkoxysilane group,

each of R<sup>2</sup> and R<sup>11</sup> independently  
represents a C<sub>1</sub>-C<sub>48</sub> hydrocarbon group,

each of R<sup>5</sup> to R<sup>7</sup> and R<sup>12</sup> independ-  
ently represents a hydrogen atom or a  
25                    C<sub>1</sub>-C<sub>48</sub> hydrocarbon group,

wherein each of R<sup>1a</sup>, R<sup>1b</sup>, R<sup>2</sup> to R<sup>4</sup>  
and R<sup>8</sup> to R<sup>15</sup> optionally independently  
has bonded thereto at least one atom se-  
lected from the group consisting of an  
oxygen atom, a nitrogen atom, a sulfur  
atom and a silicon atom, said at least  
one atom being present in a linkage  
other than a hydroxyl group, an epoxy  
group, an amino group, a silanol group  
and an alkoxysilane group, and

each of k, l, m and o is independ-  
ently an integer of 0 or more, provided  
that both k and l are not simultaneously  
0, and n is an integer of 1 or more.

3. The modified hydrogenated copolymer according to  
claim 1, which exhibits substantially no crystalliza-  
tion peak observed at -50 to 100 °C in a differential  
scanning calorimetry (DSC) chart obtained with respect  
to said modified hydrogenated copolymer.

4. The modified hydrogenated copolymer according to  
claim 1, which has a molecular weight distribution of  
from 1.5 to 5.0.

5. The modified hydrogenated copolymer according to claim 2, which is represented by the formula (I).

5 6. The modified hydrogenated copolymer according to claim 2, which is represented by the formula (II).

7. The modified hydrogenated copolymer according to claim 2, which is represented by the formula (III).

10 8. The modified hydrogenated copolymer according to claim 2, which is represented by the formula (IV).

9. The modified hydrogenated copolymer according to claim 2, which is represented by the formula (V).

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10. The modified hydrogenated copolymer according to any one of claims 1 to 4, which is a foam.

11. The modified hydrogenated copolymer according to  
20 any one of claims 1 to 4, which is a shaped article.

12. The modified hydrogenated copolymer according to claim 11, which is a multilayer film or a multilayer sheet.

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13. The modified hydrogenated copolymer according to claim 11, which is a shaped article produced by a method selected from the group consisting of an extrusion molding, an injection molding, a blow molding, an  
5 air-pressure molding, a vacuum molding, a foam molding, a multilayer extrusion molding, a multilayer injection molding, a high frequency weld molding, a slush molding and a calender molding.

10 14. The modified hydrogenated copolymer according to any one of claims 1 to 4, which is a building material, a vibration damping, soundproofing material or an electric wire coating material.

15 15. A crosslinked, modified hydrogenated copolymer obtained by subjecting the modified hydrogenated copolymer of any one of claims 1 to 4 to a crosslinking reaction in the presence of a vulcanizing agent.

20 16. A modified hydrogenated copolymer composition comprising:

1 to 99 parts by weight, relative to 100 parts by weight of the total of components (a) and (b), of (a) the modified hydrogenated copolymer of any one of  
25 claims 1 to 4, and



99 to 1 part by weight, relative to 100 parts by weight of the total of components (a) and (b), of (b) at least one polymer selected from the group consisting of a thermoplastic resin other than said modified hydrogenated copolymer (a) and a rubbery polymer other than said modified hydrogenated copolymer (a).

17. The modified hydrogenated copolymer composition according to claim 16, which is a foam.

18. The modified hydrogenated copolymer composition according to claim 16, which is a shaped article.

19. The modified hydrogenated copolymer composition according to claim 18, which is a multilayer film or a multilayer sheet.

20. The modified hydrogenated copolymer composition according to claim 18, which is a shaped article produced by a method selected from the group consisting of an extrusion molding, an injection molding, a blow molding, an air-pressure molding, a vacuum molding, a foam molding, a multilayer extrusion molding, a multilayer injection molding, a high frequency weld molding, a slush molding and a calender molding.

21. The modified hydrogenated copolymer composition according to claim 16, which is a building material, a vibration damping, soundproofing material or an electric wire coating material.

22. A crosslinked, modified hydrogenated copolymer composition obtained by subjecting the modified hydrogenated copolymer composition of claim 16 to a crosslinking reaction in the presence of a vulcanizing agent.